



Complex and Challenging Surgery like CRS with HIPEC is Easible Midst the COVID 19 Pandemic: Experience from Tertiary Care Center in India

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Abstract

Background Amidst the COVID pandemic, most guidelines have recommended delaying surgery and giving chemotherapy for with peritoneal surface malignancies. However, when all options are exhausted, complex surgery like CRS with HIPEC can be performed in select patients.

Method To facilitate these complex surgeries with maximum safety, RT-PCR test for COVID-19 was performed for each patient. Personal protective equipment including N95 masks and face shields was used. A number of OT personals were limited. Taking these steps minimized the risk of COVID-19 infections among healthcare workers and patients.

Conclusion After implementing these steps, we were able to perform complex CRS and HIPEC procedure during the pandemic and thus improve oncological outcomes.

Keywords CRS · HIPEC · COVID · Complex surgery

Introduction

We are amidst a global pandemic [1]. The novel coronavirus (COVID 19) had caused its first case in December 2019 in Wuhan, China, and since then it has spread rapidly to affect every country in the world [2]. The world of medicine has shifted its focus to combat the virus, thus diverting resources to battling the COVID 19 cases. Most of the elective cases and procedures have been restricted till the pandemic is over which is uncertain [3].

Malignancy is different sort of urgency. We do have time but not as much as in a benign case [3]. As the

pandemic is still ongoing and so are the restrictions on elective cases, we are finally at a juncture where we cannot further delay surgery for a certain subset of patients with malignancies. So, the surgical procedures should be categorized as per medically necessary, time-sensitive (MeNTS) procedures scoring system and only those absolutely necessary should be done ensuring proper utilization of the available resources [4]. Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) are such procedure which is needed in gynecological and peritoneal malignancy.

In this paper, we will focus on CRS and HIPEC for peritoneal surface malignancies (PSM) and how we have been performing these surgeries in the COVID times keeping not only the patient safety in mind but also health care workers (HCW).

Ovarian Malignancy

There have been multiple recommendations from different organizations regarding the treatment of gynecological malignancies during the COVID 19 pandemic [5]. As we know HIPEC is used as an beneficial adjunct along with cytoreduction in advanced carcinoma ovary. However,

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most of the guidelines have recommended that in advanced carcinoma ovary patients are to undergo neoadjuvant chemotherapy till crisis resolves and avoid surgery and HIPEC [5]. Most of the patients who were advised as per the guidelines have completed the neoadjuvant chemotherapy and need definitive surgeries. Metronomic therapy with cyclophosphamide, etoposide and celecoxib with or without pazopanib was also given to some group of patients [6, 7]. However, the pandemic is running longer than anticipated and we cannot make these patients wait any further or they might have disease progression and thereby poor prognosis.

As per institute protocol, we are planning these patients for CRS and HIPEC. This forms the largest group of our patients with peritoneal surface malignancies who need this procedure.

We also have a smaller subset of patients with peritoneal mesothelioma and pseudomyxoma peritonei. These patients are primarily treated with CRS and HIPEC. For optimum cytoreduction, patient selection is key and delaying surgery in this group will seriously affect the final outcome.

HIPEC is also done in patients with carcinoma colon with limited peritoneal metastasis, along with Krukenberg tumor, tumor ruptured and mucinous T₃-T₄ tumors.

Final group in whom we are doing HIPEC are patients with gastric carcinoma where PCI < 6. This is in a prophylactic setting.

The planning

The most important decision that is taken is patient selection. In the COVID era, we carefully select patient who absolutely fits the tailored indication for cytoreductive surgery and HIPEC. We make sure the decision making is shared with patient and the relatives explaining the pros and cons of the procedure and how the surgery carries an increased risk of postoperative pulmonary complications compared to the pre-COVID times [8]. Once consensus has been achieved, a preanesthetic checkup is done and prehabilitation is advised. The surgical plan is discussed with the anesthesiology team, and a detailed perioperative management plan is made. After the preanesthetic clearance, we usually post these patients fast to avoid long gap between the plan and actual surgery to avoid unnecessary repeat investigations and risk of acquiring COVID 19 in the waiting period.

Admission

Patient is planned for admission with negative COVID report at least 5 days prior to the date of surgery. At admission before getting a bed, the patient undergoes a rapid antigen test for corona virus. If negative, the patient is admitted in the preoperative ward. Patients are kept in isolation from other admitted patients. Patient is observed for at least for 4–5 days for development of any flu like symptoms. If present, we reschedule the surgery after recovery. We get a RT-PCR test for COVID 19 done one prior to surgery, and the patient will be taken to surgery only if the test is negative.

If positive, the dedicated COVID team is informed and the patient is managed either at home or at COVID isolation ward depending on their protocols based on symptoms. Once the patient is cleared by the COVID team, we reschedule the surgery following our departmental protocol.

At the operation theater (OT)

The OT meant for the surgery is fumigated on the day before surgery. We have created a separate donning and doffing area to ensure maximum safety of HCW. For the donning processes, we ensure that no gaps are present in the protective gear. Gear includes personal protective equipment (PPE), non-valved N95 mask and face shield. Patient is received in the OT only after support staff is donned for the safety of the patient. This process decreases the chances of cross-infection between the patient and the staff. Thereafter, the surgeons and anesthesiologists don and enter the OT. We keep the number of anesthesiologists, surgeons and other HCW to minimum as per recommendations of various societies [9].

The anesthesia technique is same as a non-COVID setting but due precautions are needed to ensure infection spread to the other HCWs. Intubation is a high aerosol generating procedure, and we take all precautions while intubation (aerosol box, use of video laryngoscope, clamp the endotracheal tube, inflate the cuff of endotracheal tube before ventilation, etc.). The use of full PPE for all the patients increase the difficulty for the anesthesiologists and adds to difficulty during the procedures like airway management, central line insertion and arterial line cannulation. It is also difficult to identify and communicate with the fellow colleagues donned in PPE and we often must resort to writing names on the front and using sign languages [10]. Anesthesiology team has made a provision of shifts of 4–6 h each if the surgery is prolonged to ensure HCW comfort and patient safety as shown in Fig. 1.



Fig. 1 HCW after donning

CRS

Minimizing the total OT time is important. For that, an experienced senior surgeon does the procedure. Lesser operating time gives better postoperative results and minimizes exposure. The procedure of CRS and HIPEC is done in the same way as in the pre-COVID times. It takes usually 6–8 hours on average. Surgery wearing PPE, N95 mask and face shield is challenging and causes fogging, sweating and immense discomfort. We usually keep a backup surgeons' team in case any member needs a break. HIPEC setup is managed with the OT paramedical staff, and we do not allow unnecessary staff including the HIPEC engineer or observer within the OT at the present times as shown in Fig. 2.

Postoperative period

These patients are shifted to intensive care unit (ICU) mostly intubated after the surgery for further management. The ICUs are sterile zone with positive pressure ventilation. This becomes additionally difficult in COVID setting, and one needs to be meticulous with the infection prevention practices in the postoperative period as well. The patient is extubated same day or the very next day depending upon the status of the patient, taking all COVID precautions.

After that, the patient is shifted to an isolated postoperative ward. The precautions that are taken especially in the ward are limiting visitations. The attendant who allowed is made sure that he/she is not suffering from any flu symptoms.

There are also small steps taken by the administration by creating different teams in charge of different task. For example, the team of doctors who attends OPD does not

Fig. 2 OT setup for HIPEC



come to the ward to prevent cross-contamination with doctors in ward and thus the admitted patients. These may appear trivial but has helped us to keep the patients undergoing these complex procedures safe.

Conclusion

Cancer is a special entity of disease, and delaying of surgery may cost the life. However, it is also fact that surgery in COVID era is a real challenge. Scheduling major oncological surgery like CRS with HIPEC is like walking on a tight rope, and one needs to maintain a balance between the risks of transmission of COVID 19 during the care of the patients and risk of patient dying because of non-treatment. However, in our experience with appropriate precautions and preparation, CRS and HIPEC are feasible in select patients with PSM.

Declarations

Conflict of interest The author declares that they have no conflict of interest.

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